6. 
$$7678 + 73171$$

$$\int_{0}^{2\pi} |S_{mn}| dx = \int_{0}^{\pi} |S_{mn}| dx + \int_{\pi}^{2\pi} -|S_{mn}| dx$$

$$= \left[ -\cos\chi \right]_{0}^{\pi} + \left[ \cos\chi \right]_{\pi}^{2\pi}$$

$$= 1 + 1 + 1 + 1 = 4$$